

Amendments to the Claims:

Please reconsider claims 7, 12 and 13. Please amend claims 1-3, 5-10 and 13, and please add the following new claims 98 and 99. Following is a complete listing of the claims pending in the application, as amended:

1. (Currently amended) An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed, and a second portion of the second surface exposed, the first and second portions being out of contact with the support member; and

a topographical feature detector positioned proximate to the support member and to aligned with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member.

2. (Currently amended) An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed; and

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive

detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member, and The apparatus of claim 1 wherein the topographical feature detector is configured to:

determine distances from a reference plane to a plurality of the first topographical features;

select from the determined distances a minimum distance value;

select from the determined distances a maximum distance value; and subtract the minimum distance value from the maximum distance value.

3. (Currently amended) An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features. The apparatus of claim 1 wherein the second topographical features includinge conductive structures protruding from the second surface, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed;

a first topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the first topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member; and

and wherein the topographical feature detector is a first topographical feature detector, and wherein the apparatus further comprises a second topographical feature detector positioned proximate to the support member and configured to detect a characteristic of the second

topographical features when the microelectronic substrate is supported by the support member.

4. (Original) The apparatus of claim 1 wherein at least one of the topographical feature detector and the support member is movable relative to the other while the microelectronic substrate is carried by the support member.

5. (Currently Amended) An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed; and

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member. The apparatus of claim 1 wherein the topographical feature detector includes ing of a first system configured to detect roughness features of microelectronic substrates having a first range of thicknesses, the first system being interchangeable with a second system configured to detect roughness features of microelectronic substrates having a second range of thicknesses, with a maximum thickness of the second range being greater than a maximum thickness of the first range.

6. (Currently amended) The apparatus of claim 1 wherein An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and

having second topographical features, the second topographical features including—a solder bumps, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed;

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member; and

and wherein the apparatus further comprises—a raised feature detector positioned proximate to the support member and configured to detect a characteristic of the solder bumps.

7. (Currently amended) The apparatus of claim 1 wherein the second topographical features includes—a gold bumps, and wherein the apparatus further comprises a feature detector positioned proximate to the support member and configured to detect a characteristic of the gold bumps.

8. (Currently Amended) The apparatus of claim 1, further comprising:An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed;

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive

detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member;

a first camera positioned proximate to the support member and configured to detect at least one of a position, a surface defect, and a bridge of at least one of the second topographical features of the microelectronic substrate when the microelectronic substrate is supported by the support member; and

a second camera positioned proximate to the support member and configured to detect a height of at least one of the second topographical features of the microelectronic substrate when the microelectronic substrate is supported by the support member.

9. (Currently amended) An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed. ~~The apparatus of claim 1 wherein the support member having~~ has a contact surface with a plurality of apertures, the apertures being coupleable to a vacuum source to draw the microelectronic substrate into contact with the support member; and

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member.

10. (Currently amended) An apparatus for detecting characteristics of a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features, the apparatus comprising:

a support member configured to carry the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed. ~~The apparatus of claim 1 wherein the support member having has a generally ring-shaped contact surface, and wherein the first portion of the first surface of the microelectronic substrate is disposed annularly inwardly from the contact surface when the support member carries the microelectronic substrate; and~~

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member.

11. (Original) The apparatus of claim 1 wherein the topographical feature detector includes a probe having a contact portion configured to contact the microelectronic substrate, the topographical feature detector being configured to detect a roughness of the microelectronic substrate based on measurements at a plurality of locations on the microelectronic substrate.

12. (Original) The apparatus of claim 1 wherein the topographical feature detector includes a radiation receiver positioned to receive radiation reflected from the microelectronic substrate, the topographical feature detector being configured to detect a roughness of the microelectronic substrate based on measurements at a plurality of locations on the microelectronic substrate.

13. (Currently amended) The apparatus of claim 1 wherein the topographical feature detector includes a laser beam emitter positioned to direct radiation toward the microelectronic substrate, the topographical feature detector further including a laser beam receiver positioned to receive radiation reflected from the microelectronic substrate, the topographical feature detector being configured to detect a roughness of the microelectronic substrate based on measurements at a plurality of locations on the microelectronic substrate.

14-97. (Cancelled)

98. (New) The apparatus of claim 1, further comprising the microelectronic substrate.

99. (New) A detection assembly comprising:

a microelectronic substrate having a first surface with first topographical features and a second surface facing opposite from the first surface and having second topographical features;

a support member carrying the microelectronic substrate with a first portion of the first surface exposed and a second portion of the second surface exposed; and

a topographical feature detector positioned proximate to the support member to align with the first portion of the first surface of the microelectronic substrate, the topographical feature detector including a non-capacitive detection device configured to detect roughness characteristics of the first surface when the microelectronic substrate is carried by the support member.